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Association Between the Frequency of Physical  
Education Classes and the Prevalence of  
Overweight/Obesity in Adolescents

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PMCH 691 – MPH Research Project

Virginia Commonwealth University  
Medical College of Virginia Campus  
School of Medicine

Department of Preventive Medicine and Community Health

Master of Public Health Program

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# **Project Submission Statement for the MPH Research Project**

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*Association Between the Frequency of Physical Education Classes and the Prevalence of Overweight/Obesity in Adolescents*

**ABSTRACT**

**Background/Objective:** Overweight and obesity has been steadily on the rise in the United States for all groups. The prevalence of obesity for adolescents has tripled since 1980. The purpose of this study is to determine an association between the frequency of physical education classes and the prevalence of overweight/obesity in adolescents in the United States.

**Methods:** This was a cross-sectional study that used the 2001 Youth Risk Behavior Survey (YRBS) of the Center for Disease Control. The outcome variable for the study was Body Mass Index (BMI). A BMI of 25 or greater was considered overweight or obese. The main independent variable was frequency of attending physical education classes. Other independent variables were included such as demographics, nutrition, physical activity, and drug use. Univariate and multivariate statistical analysis methods were used to calculate the odds ratios for frequency of physical education classes and other risk factors for overweight and obesity. Adjusted odds ratios and their 95% confidence intervals were calculated by using a multivariate logistic regression model. SPSS 11.0 and Epiinfo 6.04 were the statistical software used for the statistical analysis.

**Results:** The study indicates that about 26% of adolescents in the United States are either overweight or obese. It was found that about 50% of adolescents do not attend PE class at all during the week. No statistically significant relationship was found between enrollment in physical education classes and overweight/obesity in adolescents, adjusting for confounders (OR=0.95 CI=0.81-1.11). There was no statistically significant relationship between the frequency of physical education classes and the overweight/obesity of adolescents, adjusting for confounders (OR=1.01 CI=0.95-1.08).

**Conclusion:** The data shows that there is no direct relationship between the frequency of physical education classes and the prevalence of overweight/obesity, although there is a direct correlation between physical activity and the prevalence of overweight/obesity, which is found in the literature. The content of physical education classes needs to be assessed as well as providing more classes that incorporate physical activity.

**INTRODUCTION:** Overweight and obesity are becoming an enormous public health issue in our nation, especially in our adolescents. Every time the news comes on, there is something relating to overweight or obesity. The prevalence of overweight and obesity has tripled since 1980, going from 5% to 15% in 2000.<sup>19</sup> This epidemic is becoming a growing concern because of the health risks that are associated with it. A person that is overweight is considered to have a body mass index of 25 to 29.99. A person that is obese is considered to have a body mass index of 30 or higher.<sup>19</sup> Some consequences of overweight or obesity in adolescents are such things as hypertension, diabetes, respiratory disease, psychosocial dysfunction, and orthopedic disorders.<sup>20</sup> Studies have also shown that if a child is overweight or obese, they are at risk of having higher morbidity and mortality rates in adulthood.<sup>20</sup> The estimated annual hospital tab for juvenile obesity related illnesses is \$127 million.<sup>20</sup>

Overweight and obesity are caused by behavioral, environmental, cultural, and socioeconomic factors.<sup>5</sup> The literature states that as weight increases, so does the prevalence of health risks.<sup>5</sup> Nutrition education and physical activity need to be incorporated into the lives of our youth because of the steady increase of overweight and obesity. Patterns of healthful eating behavior need to begin in childhood and be maintained throughout adulthood.<sup>5</sup> Physical activity is another component that needs to be addressed to reduce the number of overweight and obese people. Adolescents over the years have become more sedentary, and this is a major factor. The dominant activity among youth is playing computer games or watching television.<sup>7</sup> It has been reported that teenage boys lose some fat accumulated before puberty during adolescence, but fat deposition continues in girls.<sup>5</sup> Since over the past 30 years there has been a significant

increase in the prevalence of obesity, this shows that it is more so lifestyle than genetic factors that affect obesity.

Physical education classes in schools can be a perfect opportunity for students to get their physical activity to reduce their risk of becoming obese or overweight.

Although schools appear to be the perfect opportunity for children, it does not seem to happen that way. Studies among youth have shown that participation in physical activity and time devoted to the gymnasium in schools are falling.<sup>7</sup> There have been numerous reasons why physical activity is on the decline in schools such as tightening budgets, reduced facilities and other lost resources with a combined emphasis on academic subjects.<sup>7</sup> Many schools have been forced to have regular classroom teachers organize physical education because budget cuts have eliminated a lot of physical education teachers, but that presents an issue because in many cases these teachers are neither qualified or physically capable of doing this.<sup>7</sup> Over the years there has been a decline in the percentage of students who were enrolled in physical education classes.<sup>7</sup> As the student's grade level increased there was a decrease in enrollment as well.<sup>7</sup>

Observational studies suggest that many of the students who are in physical education classes are standing passively while the high achieving students control the game and expend most of the energy.<sup>8</sup> For youth, regular physical activity results in improved strength and energy, it enhances cardiorespiratory fitness leading to better endurance, and it improves the muscle/fat ratio leading to better physical appearance.<sup>13, 14</sup>

The importance of physical activity has been shown to be significant. Since children are required to attend schools, or have some form of education, schools must emphasize the importance as well.

**OBJECTIVE:** The purpose of this study is to determine a relationship between the frequency of attending physical education classes and the prevalence of overweight or obesity in adolescents.

**METHODS:** This study was a cross-sectional study that used the Youth Risk Behavior Survey (YRBS) provided by the Center for Disease Control. The 2001 YRBS employed a three stage cluster sample design to produce a nationally representative sample of students in grades 9-12. To enable separate analysis of data for Black and Hispanic students, schools with substantial numbers of Black and Hispanic students were sampled at higher rates than all other schools. One hundred fifty of 199 sampled schools participated in the national survey. There were 13,601 usable questionnaires received from the 16,398 students sampled. The school response rate was 75%, and the student response rate was 83%, resulting in an overall response rate of 63%. For the current study, Caucasian ( $n=5977$ ), African-American ( $n=2361$ ), and Hispanic ( $n=3064$ ) adolescents responding to the 2001 YRBS were included. Ages ranged from 13 to 19 years, with approximately equal distribution across the 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, and 12<sup>th</sup> grades.

This study was designed to answer if there is a relationship between frequency of attending physical education classes and the prevalence of overweight and obesity in adolescents. The independent variable is overweight and obesity which was determined by a Body Mass Index of 25 or higher. The main study variable included is frequency of attending physical education classes. Other study variables included were gender, age, race/ethnicity, education level, grades, geographic region, metropolitan status, smoking status, alcohol and drug use, body image perception, fruit and vegetable intake, hours of

television, number of sports teams, vigorous and moderate physical activity, and depression status. Below are the covariates used in the study and the classification criteria of the variables.

Body Mass Index (BMI) was calculated using respondents' self-reported height without shoes and weight without shoes. Frequency of attending physical education classes was categorized into none, 1 day, 2 days, 3 days, 4 days, and 5 days a week. Age was categorized as 13 to 15 years old, 16 yrs. old, and 17 to 19 yrs. old. Smoking status was determined by whether or not they have ever smoked. Drug use was determined if the student answered yes to ever using marijuana, heroin, or cocaine. Alcohol use was determined by whether or not the student has ever drunk. Grades were categorized by A's, B's, C's, and D's and F's. Body image perception was categorized into underweight ("very underweight" or "slightly underweight"), normal weight ("about the right weight"), and overweight ("very overweight" or "slightly overweight"). Fruit and vegetable intake was determined by whether or not the student had consumed any fruit, vegetable, or salad in the past 7 days. If the respondent answered yes than he/she was considered to have consumed fruits and vegetables. Vigorous physical activity was determined by how many days in the past 7 days did the student do physical activity for at least 20 minutes in which he/she sweated and breathed hard, such as basketball, soccer, running, swimming laps, etc. Moderate physical activity was defined as physical activity for at least 30 minutes that did not make he/she sweat or breathe hard, such as fast walking, slow bicycling, mopping floors, etc. Moderate physical activity was categorized by the number of days as well. Hours of television was defined as how many hours the student watched television on a regular school night, and the groups were categorized as



none, 1 hour or less, 2 to 3 hours, and 4 or more hours. Depression was classified by if the respondent claimed to have felt “so sad or hopeless almost every day for 2 weeks or more in a row that they stopped doing some usual activities” in the past 12 months. The respondent’s geographic region was categorized as South, West, Northeast, and Midwest and metropolitan status was categorized as urban, rural, suburban, or other.

Overweight and obese adolescents were compared with normal weight adolescents in all the study variables. P-values were used to measure the bivariate associations between overweight and obesity and each of the study variables. To test for a significant relationship between frequency of attending physical education classes and BMI, logistic regression models were developed. Logistic regression was created with BMI being the dependent variable and the adjusted odds ratios and 95% confidence intervals were found. The difference between the two models was for one model frequency of attending physical education classes was categorized as whether the student was enrolled or not and the second model was categorized by the number of days per week the student attended physical education class. All statistical analysis was performed by using SPSS and Epiinfo 6.04.

**RESULTS:** The study population is shown in Table 1 of the appendix. The study population was 49% male, 48% White, 19% African-American, 25% Hispanic. Forty-eight percent of the population was from the South and 32.3% were from the West. Fifty-three percent were from an urban area and approximately 37% were from the suburbs. Out of the total population, approximately 26% were overweight or obese. Of

the overweight or obese group, 51% of them were not enrolled in physical education class at all. Of the same group, 34% of them had physical education class 5 days a week.

Table 2 shows the relationship between the overweight or obese group and the normal weight group of adolescents. The overweight or obese group tended to be male ( $p < 0.001$ ), nonsmokers ( $p < 0.001$ ), non-drug users ( $p = 0.001$ ), and alcohol users ( $p < 0.05$ ). There was no significant difference between the overweight or obese group and the normal weight group among the different days of attending physical education classes ( $p = 0.379$ ). Among the different ethnic groups, there was a significant difference between the normal and the overweight and obese group ( $p < 0.001$ ). Among the category of grades that students received, there was a significant difference between the overweight or obese group and the normal weight group ( $p < 0.001$ ). There was also a significant difference between the overweight or obese group and the normal weight group within the different grade levels ( $p < 0.001$ ). Within the body image perception category, there was a significant difference between the overweight or obese group and the normal weight group ( $p < 0.001$ ). Regarding the amount of physical activity, vigorous and moderate, there was a significant difference between the overweight or obese group and the normal weight group ( $p < 0.05$ ). In the category of number of sports teams, there was a significant difference between the overweight or obese category and the normal weight category as well ( $p < 0.001$ ).

Table 3 shows the prevalence of the study characteristics analyzed. In our unadjusted analysis, the prevalence of being obese or overweight if a student did not attend physical education class was 26.1% (95% Confidence Interval [CI], 24.96-27.25). Students that attended physical education class one day a week had a prevalence of

28.8% (95% CI, 23.14-35.23). Students that attended physical education classes twice a week had a prevalence of 23.8% (95% CI, 19.27-28.87). Students that attended physical education classes three times a week had a prevalence of 24.1% (95% CI, 21.36-26.97). Students that attended physical education classes four times a week had a prevalence of 22.8% (95% CI, 19.5-27.78). Students that attended physical education classes five times a week had a prevalence of 25.2% (95% CI, 23.9-26.62). Out of the adolescents that reported that they felt underweight, their prevalence of obesity or overweight was 6.4% (95% CI, 5.39-7.63). Out of the adolescents that reported that they had a normal weight, their prevalence of being overweight or obese was 13.4% (95% CI, 12.64-14.27). Of the adolescents that reported being overweight, their prevalence for being overweight or obese was 58.5% (95% CI, 56.88-60.08).

There was no statistically significant relationship between a student enrolled in a physical education class and a student not enrolled in a physical education class related to overweight or obesity (Odds Ratio=0.95, 95% CI=0.81-1.11). Table 4 shows the adjusted odds ratios [OR] of the frequency of attending physical education classes and other independent variables analyzed. Odds Ratios [OR] of <1 show a decreased odds of becoming overweight or obese and an odds ratio >1 show a increased odds of becoming overweight or obese. Using students that attended physical education class five times a week as the reference group, students that did not have physical education class showed a decreased odds of 0.93 (95% CI, 0.78-1.09); 1 day a week had an increased odds of 1.21 (95% CI, 0.83-1.76); 2 days a week had a decreased odds 0.80 (95% CI, 0.56-1.14); 3 days a week had a decreased odds of 0.94 (95% CI, 0.76-1.17; and 4 days a week had a decreased odds of 0.80 (95% CI, 0.57-1.12). Adjusting for confounders, vigorous

physical activity was found not to be significant (OR=0.98, 95% CI, 0.95-1.00). Blacks were found to be 1.7 (95% CI, 1.5-2.0) times more likely than whites to be overweight or obese. Hispanics were 1.5 (95% CI, 1.34-1.77) times more likely to be overweight or obese compared to whites. Males were 1.7 (95% CI, 1.53-1.92) times more likely to be overweight or obese compared to females. Students that received D's and F's for their grades were 1.4 (95% CI, 1.16-1.77) times more likely to be overweight or obese compared to students that received A's. Students that did not participate on a sports team had an increased odds of 1.28 (95% CI, 1.06-1.53) of becoming overweight or obese compared to students that participated on 3 or more teams during the year. Students that watch television 4 or more hours a school night were 1.6 (95% CI, 1.26-2.10) times more likely to be overweight or obese compared to students that do not watch any television. Students that smoke are 1.23 (95% CI, 1.07-1.41) times more likely to be overweight or obese compared to students that do not smoke. Students that used cocaine, marijuana, or heroin had an increased odds of 1.27 (95% CI, 1.12-1.44) of becoming overweight or obese.

**DISCUSSION:** After adjusting for confounders, frequency of attending physical education class was shown not to have a significant relationship with the prevalence of overweight and obesity. There was found to be a significant relationship between physical activity and overweight and obesity, which correlates with the literature.<sup>7, 10</sup> This is a key finding in the study because it tells us that physical activity is important in the lives of our adolescents although the frequency of physical education classes was not found to be significant. It is also worth pointing out the body image perception of the adolescents. Some students considered themselves underweight and normal weight and

their BMI classified them as being overweight or obese. This suggests that there is a culture difference of what people think their weight should be. A study done by the CDC was found in the literature and it explained differences in culture and body image perception as well.<sup>21</sup>

Some limitations of the study are that the survey utilized self-report responses from adolescents, which pose potential threats to reliability and validity. Frequency of attending physical education classes was based on the previous week, and it is not truly representative of their weekly routine. Both the adolescent's height and weight were self-reported. Due to the complexity of the sampling design, SUDAAN was recommended for this study. The cross-sectional study design is also a weakness of the study. Only the frequency of attending physical education was looked at and not the amount of physical activity within the class. Some strengths of the study are that the YRBS is a national survey, and it consists of a large sample size. Further studies should evaluate the amount of physical activity actually done in physical education classes. A cohort study is suggested to actually assess the amount of physical activity in physical education classes.

**CONCLUSION:** Adolescents are required to attend schools or participate in some form of education. Schools are a perfect opportunity for students to get physical activity. Schools can provide other classes that provide physical activity that interest a variety of students, such as dance or aerobics. Sports team involvement showed that if student's participated in more sports, their chance of becoming overweight or obese was reduced. Schools should incorporate intramural sports into their school system because they are not as expensive as formal sports. Another suggestion is to separate Health (academic)

and physical education (physical activity) into separate classes. Schools need to take the responsibility of physical activity for the students because once the students leave the schools, nothing is guaranteed.

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**TABLE 1**

THE DISTRUBUTION OF CHARACTERISTICS OF THE STUDY POPULATION

<b><u>VARIABLE</u></b>	<b><u>TOTAL N</u></b>	<b><u>TOTAL %</u></b>
<b>Obese(N=12576)</b>		
Yes	3238	25.7
<b>Gender(N=12576)</b>		
Male	6602	48.9
<b>Race/Ethnicity(N=12425)</b>		
White	5977	48.1
Black	2361	19.0
Hispanic	3064	24.7
Other	1023	8.2
<b>Age(N=12576)</b>		
15 & younger	3904	31.0
16	3232	25.7
17 & older	5440	43.3
<b>Education level(N=12531)</b>		
9th grade	3072	24.5
10th grade	3072	24.5
11th grade	3241	25.9
12th grade	3146	25.1
<b>Grades(N=12443)</b>		
A's	2980	23.9
B's	4919	39.5
C's	3220	25.9
D's & F's	1324	10.6
<b>Geographic Region(N=12576)</b>		
Northeast	777	6.2
Midwest	1831	14.6
South	5904	46.9
West	4064	32.3
<b>Metropolitan Status(N=12576)</b>		
Urban	4633	36.8
Suburban	6667	53.0
Rural	1199	9.5
Unknown	77	0.6
<b>Smoking Status(N=12269)</b>		
Yes	4321	35.2
<b>Drug use(N=12378)</b>		
Yes	5594	45.2
<b>Alcohol Use(N=11264)</b>		
Yes	8910	79.1
<b>Body Image Perception(N=12463)</b>		
Underweight	1931	15.5
Normal weight	6827	54.8
Overweight	3705	29.7
<b>Fruits and Veggies(N=10382)</b>		
Yes	9903	95.4
<b>Exercise for weight loss/30 days(N=12443)</b>		
Yes	7233	58.1

**Table 1 (continued)**

<b>VARIABLE</b>	<b>TOTAL N</b>	<b>TOTAL %</b>
<b>Hours of Television/day(N=12322)</b>		
None	805	6.5
1 hour or less	3412	27.7
2 - 3 hours	5009	40.7
4 or more hours	3096	25.1
<b>Frequency of PE /week</b>		
None	5769	76.1
1 day	229	3.0
2 days	320	4.2
3 days	927	12.2
4 days	333	4.4
5 days	3983	34.5
<b>Physical activity in PE class/day(N=11210)</b>		
None	5576	49.7
less than 30 minutes	1910	17.0
31 - 50 minutes	2090	18.6
51 or more minutes	1634	14.6
<b>Sports Teams/year(N=12288)</b>		
0	5624	45.8
1	3012	24.5
2	1988	16.2
3 or more	1664	13.5
<b>Vigorous Activity/week(N=12067)</b>		
None	2097	17.4
1 day	1160	9.6
2 days	1274	10.6
3 days	1420	11.8
4 days	1052	8.7
5 days	4217	13.9
6 days	847	7.0
7 days	2539	21.0
<b>Moderate Activity/week(N=12427)</b>		
None	3937	31.7
1 day	1556	12.5
2 days	1658	13.3
3 days	1385	11.1
4 days	829	6.7
5 days	900	7.2
6 days	404	3.3
7 days	1758	14.1
<b>Depression Status(N=12528)</b>		
Yes	3674	29.3

**TABLE 2: THE RELATIONSHIP BETWEEN OVERWEIGHT/OBESITY AND NORMAL WEIGHT IN ADOLESCENTS**

VARIABLE	NORMAL WEIGHT		OVERWEIGHT/OBESE		P-VALUE
	N	%	N	%	
<b>Gender(N)</b>	<b>9338</b>		<b>3238</b>		<b>0.000</b>
Male	4276	45.8	1873	57.8	
Female	5062	54.2	1365	42.2	
<b>Race/Ethnicity(N)</b>	<b>9229</b>		<b>3196</b>		<b>0.000</b>
White	4695	50.9	1282	40.1	
Black	1615	17.5	746	23.3	
Hispanic/Latino	2120	23.0	944	29.5	
Other	799	8.7	224	7.0	
<b>Age(N)</b>	<b>9338</b>		<b>3238</b>		<b>0.000</b>
15 & younger	3087	33.1	817	25.2	
16	2381	25.5	851	26.3	
17 & older	3870	41.4	1570	48.5	
<b>Education level(N)</b>	<b>9304</b>		<b>3227</b>		<b>0.000</b>
9th grade	2409	25.9	663	20.5	
10th grade	2320	24.9	752	23.3	
11th grade	2345	25.2	896	27.7	
12th grade	2230	24.0	916	28.4	
<b>Grades(N)</b>	<b>9243</b>		<b>3200</b>		<b>0.000</b>
A's	2420	26.2	560	17.5	
B's	3662	39.6	1257	39.3	
C's	2252	24.4	968	30.3	
D's & F's	909	9.8	415	13.0	
<b>Geographic Region(N)</b>	<b>9338</b>		<b>3238</b>		<b>0.000</b>
Northeast	571	6.1	206	6.4	
Midwest	1404	15.0	427	13.2	
South	4265	45.7	1639	50.6	
West	3098	33.2	966	29.8	
<b>Metropolitan Status(N)</b>	<b>9338</b>		<b>3238</b>		<b>0.000</b>
Urban	3333	35.7	1300	40.1	
Suburban	5011	53.7	1656	51.1	
Rural	930	10.0	269	8.3	
Unknown	64	0.7	13	0.4	
<b>Smoking Status(N)</b>	<b>9123</b>		<b>3146</b>		<b>0.000</b>
Yes	3322	36.4	999	31.8	
No	5801	63.6	2147	68.2	
<b>Drug use(N)</b>	<b>9196</b>		<b>3182</b>		<b>0.001</b>
Yes	4073	44.3	1521	47.8	
No	5123	55.7	1661	52.2	
<b>Alcohol Use(N)</b>	<b>8387</b>		<b>2877</b>		<b>0.038</b>
Yes	6595	78.6	2315	80.5	
No	1792	21.4	562	19.5	
<b>Body Image Perception(N)</b>	<b>9255</b>		<b>3208</b>		<b>0.000</b>
Underweight	1807	19.5	124	3.9	
Normal weight	5910	63.9	917	28.6	
Overweight	1538	16.6	2167	67.5	
<b>Fruits and Veggies(N)</b>	<b>7762</b>		<b>2620</b>		<b>0.231</b>
Yes	7415	95.5	2488	95.0	
No	347	4.5	132	5.0	

Table 2 (continued)

VARIABLE	NORMAL WEIGHT		OVERWEIGHT/OBESE		P-VALUE
	N	%	N	%	
<b>Hours of Television/day(N)</b>	<b>9161</b>		<b>3161</b>		<b>0.000</b>
None	649	7.1	156	4.9	
1 hour or less	2710	29.6	702	22.2	
2 - 3 hours	3695	40.3	1314	41.6	
4 or more hours	2107	23.0	989	31.3	
<b>Frequency of PE class/week(N)</b>	<b>8610</b>		<b>2951</b>		<b>0.379</b>
None	4264	49.5	1505	51.0	
1 day	163	1.9	66	2.2	
2 days	244	2.8	76	2.6	
3 days	704	8.2	223	7.6	
4 days	257	3.0	76	2.6	
5 days	2978	34.6	1005	34.1	
<b>Physical activity per PE class(N)</b>	<b>8338</b>		<b>2872</b>		<b>0.218</b>
None	4113	49.3	1463	50.9	
less than 30 min	1448	17.4	462	16.1	
31-50 min	1573	18.9	517	18.0	
51 or more min	1204	14.4	430	15.0	
<b>Sports Teams/year(N)</b>	<b>9131</b>		<b>3157</b>		<b>0.000</b>
None	4065	44.5	1559	49.4	
1 team	2268	24.8	744	23.6	
2 teams	1508	16.5	480	15.2	
3 or more teams	1290	14.1	374	11.8	
<b>Vigorous Activity/week(N)</b>	<b>8943</b>		<b>3124</b>		<b>0.028</b>
None	1541	17.2	566	17.8	
1 day	843	9.4	317	10.1	
2 days	905	10.1	369	11.8	
3 days	1048	11.7	372	11.9	
4 days	772	8.6	280	9.0	
5 days	1269	14.2	409	13.1	
6 days	650	7.3	197	6.3	
7 days	1915	21.4	624	20.0	
<b>Moderate Activity/week(N)</b>	<b>9232</b>		<b>3195</b>		<b>0.020</b>
None	2888	31.3	1049	32.8	
1 day	1114	12.1	442	13.8	
2 days	1254	13.6	404	12.6	
3 days	1057	11.4	328	10.3	
4 days	619	6.7	210	6.6	
5 days	657	7.1	243	7.6	
6 days	314	3.4	90	2.8	
7 days	1329	14.4	429	13.4	

**TABLE 3**  
**THE PREVALENCE OF OVERWEIGHT/OBESITY IN ADOLESCENTS**

<b>VARIABLE</b>	<b>TOTAL(N)</b>	<b>OVERWEIGHT/OBESE(N)</b>	<b>PREVALENCE(%)</b>	<b>95% CI</b>
<b>Gender</b>	<b>12576</b>	<b>3238</b>	<b>25.8</b>	<b>24.99 - 26.52</b>
Male	6602	1873	28.4	27.29 - 29.48
Female	6952	1365	19.6	18.71 - 20.59
<b>Race/Ethnicity</b>	<b>12425</b>	<b>3196</b>	<b>25.7</b>	<b>24.96 - 26.50</b>
White	5977	1282	21.5	20.42 - 22.52
Black	2361	746	31.6	29.73 - 33.52
Hispanic/Latino	3064	944	30.8	29.18 - 32.48
Other	1023	224	21.9	19.42 - 24.58
<b>Age</b>	<b>12576</b>	<b>3238</b>	<b>25.8</b>	<b>24.99 - 26.52</b>
15 & younger	3904	817	20.9	19.67 - 22.24
16	3232	851	26.3	24.83 - 27.89
17 & older	5440	1570	28.9	27.66 - 30.09
<b>Education level</b>	<b>12531</b>	<b>3227</b>	<b>25.8</b>	<b>25.00 - 26.54</b>
9th grade	3072	663	21.6	20.15 - 23.09
10th grade	3072	752	24.5	22.98 - 26.05
11th grade	3241	896	27.6	26.12 - 29.23
12th grade	3146	916	29.1	27.54 - 30.75
<b>Grades</b>	<b>12443</b>	<b>3200</b>	<b>25.7</b>	<b>24.95 - 26.50</b>
A's	2980	560	18.8	17.41 - 20.25
B's	4919	1257	25.6	24.34 - 26.80
C's	3220	968	30.1	28.49 - 31.68
D's & F's	1324	415	31.3	28.87 - 33.93
<b>Geographic Region</b>	<b>12576</b>	<b>3238</b>	<b>25.8</b>	<b>24.99 - 26.52</b>
Northeast	777	206	26.5	23.47 - 29.79
Midwest	1831	427	23.3	21.41 - 25.34
South	5904	1639	27.8	26.62 - 28.93
West	4064	966	23.8	22.47 - 25.12
<b>Metropolitan Status</b>	<b>12576</b>	<b>3238</b>	<b>25.8</b>	<b>24.99 - 26.52</b>
Urban	4633	1300	28.1	26.77 - 29.38
Suburban	6667	1656	24.8	23.81 - 25.90
Rural	1199	269	22.4	20.12 - 24.93
Unknown	77	13	16.9	9.64 - 27.51
<b>Frequency of PE class/week</b>	<b>11561</b>	<b>2951</b>	<b>25.5</b>	<b>24.73 - 26.33</b>
None	5769	1505	26.1	24.96 - 27.25
1 day	229	66	28.8	23.14 - 35.23
2 days	320	76	23.8	19.27 - 28.87
3 days	927	223	24.1	21.36 - 26.97
4 days	333	76	22.8	19.50 - 27.78
5 days	3983	1005	25.2	23.90 - 26.62
<b>Physical activity per PE class</b>	<b>11210</b>	<b>2872</b>	<b>25.6</b>	<b>24.82 - 26.44</b>
None	5576	1463	26.2	25.09 - 27.42
less than 30 min	1910	462	24.2	22.30 - 26.19
31-50 min	2090	517	24.7	22.91 - 26.66
51 or more min	1634	430	26.3	24.21 - 28.54
<b>Smoking Status</b>	<b>12269</b>	<b>3146</b>	<b>25.6</b>	<b>24.87 - 26.43</b>
Yes	4321	999	23.1	21.88 - 24.41
No	7948	2147	27.0	26.04 - 28.01
<b>Drug use</b>	<b>12378</b>	<b>3182</b>	<b>25.7</b>	<b>24.94 - 26.49</b>
Yes	5594	1521	27.2	26.03 - 28.38
No	6784	1661	24.5	23.47 - 25.53
<b>Alcohol Use</b>	<b>11264</b>	<b>2877</b>	<b>25.5</b>	<b>24.74 - 26.36</b>
Yes	8910	2315	26.0	25.08 - 26.91
No	2354	562	23.9	22.17 - 25.66

Table 3 (continued)

VARIABLE	TOTAL(N)	OVERWEIGHT/OBESE(N)	PREVALENCE(%)	95% CI
<b>Body Image Perception</b>	<b>12463</b>	<b>3208</b>	<b>25.7</b>	<b>24.98 - 26.52</b>
Underweight	1931	124	6.4	5.39 - 7.63
Normal weight	6827	917	13.4	12.64 - 14.27
Overweight	3705	2167	58.5	56.88 - 60.08
<b>Fruits and Veggies</b>	<b>10382</b>	<b>2620</b>	<b>25.2</b>	<b>24.40 - 26.09</b>
Yes	9903	2488	25.1	24.27 - 25.99
No	479	132	27.6	23.65 - 31.83
<b>Hours of Television/day</b>	<b>12322</b>	<b>3161</b>	<b>25.7</b>	<b>24.89 - 26.44</b>
None	805	156	19.4	16.74 - 22.32
1 hour or less	3412	702	20.6	19.24 - 21.98
2 - 3 hours	5009	1314	26.2	25.02 - 27.48
4 or more hours	3096	989	31.9	30.31 - 33.62
<b>Sports Teams/year</b>	<b>12288</b>	<b>3157</b>	<b>25.7</b>	<b>24.92 - 26.48</b>
None	5624	1559	27.7	26.56 - 28.91
1 team	3012	744	24.7	23.18 - 26.29
2 teams	1988	480	24.1	22.29 - 26.10
3 or more teams	1664	374	22.5	20.51 - 24.57
<b>Vigorous Activity/week</b>	<b>12067</b>	<b>3124</b>	<b>25.9</b>	<b>25.11 - 26.68</b>
None	2097	566	27.0	25.11 - 28.96
1 day	1160	317	27.3	24.80 - 30.01
2 days	1274	369	29.0	26.50 - 31.56
3 days	1420	372	26.2	23.94 - 28.58
4 days	1052	280	26.6	23.99 - 29.42
5 days	4217	409	9.7	8.83 - 10.64
6 days	847	197	23.3	20.48 - 26.28
7 days	2539	624	24.6	22.92 - 26.31
<b>Moderate Activity/week</b>	<b>12427</b>	<b>3195</b>	<b>25.7</b>	<b>24.95 - 26.49</b>
None	3937	1049	26.6	25.27 - 28.06
1 day	1556	442	28.4	26.19 - 30.73
2 days	1658	404	24.4	22.33 - 26.52
3 days	1385	328	23.7	21.48 - 26.03
4 days	829	210	25.3	22.43 - 28.46
5 days	900	243	27.0	24.15 - 30.05
6 days	404	90	22.3	18.38 - 26.72
7 days	1758	429	24.4	22.42 - 26.49
<b>Depression Status</b>	<b>12528</b>	<b>3226</b>	<b>25.8</b>	<b>24.99 - 26.53</b>
Yes	3674	1002	27.3	25.84 - 28.75
No	8854	2224	25.1	24.22 - 26.04

**TABLE 4**  
**THE ADJUSTED ANALYSIS OF OVERWEIGHT AND OBESITY OF STUDY VARIABLES**

<b>VARIABLE</b>	<b>TOTAL(N)</b>	<b>OVERWEIGHT/OBESE(N)</b>	<b>ADJUSTED OR</b>	<b>95% CI</b>
<b>Gender</b>				
Male	6602	1873	1.72	1.53 - 1.92
<b>Race/Ethnicity</b>				
White	5977	1282	1.00	
Black	2361	746	1.72	1.47 - 2.02
Hispanic/Latino	3064	944	1.54	1.34 - 1.77
Other	1023	224	1.02	0.83 - 1.27
<b>Education level</b>				
9th grade	3072	663	1.00	
10th grade	3072	752	1.19	0.98 - 1.43
11th grade	3241	896	1.47	1.14 - 1.89
12th grade	3146	916	1.63	1.23 - 2.17
<b>Grades</b>				
A's	2980	560	1.00	
B's	4919	1257	1.22	1.06 - 1.41
C's	3220	968	1.42	1.21 - 1.67
D's & F's	1324	415	1.43	1.16 - 1.77
<b>Frequency of PE class</b>				
None	5769	1505	0.93	0.78 - 1.09
1 day	229	66	1.21	0.83 - 1.76
2 days	320	76	0.80	0.56 - 1.14
3 days	927	223	0.94	0.76 - 1.17
4 days	333	76	0.80	0.57 - 1.12
5 days	3983	1005	1.00	
<b>Sports Teams/year</b>				
None	5624	1559	1.28	1.06 - 1.53
1 team	3012	744	1.15	0.94 - 1.37
2 teams	1988	480	1.04	0.84 - 1.27
3 or more teams	1664	374	1.00	
<b>Vigorous Activity/week</b>				
None	2097	566	1.16	0.95 - 1.40
1 day	1160	317	1.21	0.97 - 1.50
2 days	1274	369	1.38	1.13 - 1.70
3 days	1420	372	1.21	0.99 - 1.48
4 days	1052	280	1.34	1.08 - 1.66
5 days	4217	409	1.09	0.90 - 1.31
6 days	847	197	1.12	0.88 - 1.41
7 days	2539	624	1.00	
<b>Hours of Television/day</b>				
None	805	156	1.00	
1 hour or less	3412	702	1.15	0.89 - 1.48
2 - 3 hours	5009	1314	1.48	1.16 - 1.90
4 or more hours	3096	989	1.62	1.26 - 2.10
<b>Smoking Status</b>				
Yes	4321	999	1.23	1.07 - 1.41
<b>Drug use</b>				
Yes	5594	1521	1.27	1.12 - 1.44